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EXAMINER	
LE, BRIAN Q	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/623,127	RODYUSHKIN ET AL.	
	Examiner	Art Unit	
	BRIAN Q. LE	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) *30-32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment and Arguments

1. Applicant's amendment filed April 14, 2008, has been entered and made of record.

2. Applicant's arguments with regard to claims 1-29 have been fully considered, but are not considered persuasive because of the following reasons:

Regarding independent claims 1, 9, 18, and 27, the Applicant argues (page 9 of the Remarks) that Tian and Prokoski, alone or in combination, fails to describe/suggest "a medium bearing a deformable model configured to ... compute transformation parameters that represent a transformation on the deformable model to the positions of the four points". The Applicant indicated that Prokoski's teaching is concerned with the dynamics of facial movements as recorded by a time sequence of thermal images of a subject's face and the Applicant asserted that one of ordinary skill in the art understands that such a time sequence is not equivalent to a deformable model. The Examiner respectfully disagrees.

First, what is deforming? The Applicant indicated (page 4, line 7 of the Specification) is "changing". Thus, it is clearly known to one skilled in the art (and as stated by the Applicant) that deformable model is the changes/variation ability of model. In this case, Prokoski teaches the dynamics of facial movements which are the changes/variation of model. Thus, one of ordinary skill in the art can reasonably interpret this as deformable model. Also, when the Applicant asserted that one of ordinary skill in the art understands that a time sequence is not equivalent to a deformable model. This argument is moot, because Prokoski discloses (as admitted by the Applicant) not just time sequence itself but discloses the dynamics of facial movements as recorded by a time sequence of thermal images of a subject's face.

The Examiner believes that all the arguments of the Applicant have been properly addressed and explained. Thus, the rejections of all of the claims are maintained.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Tian et al. U.S. Patent No. 6,879,709 and Prokoski U.S. Patent No. 7,027,621.

Regarding claim 1, Tian teaches a medium bearing a deformable model (detect an expression of the face by using model to detect the changes of facial images by the process of normalization since normalization is known to compensate changes and variance of position, pose, scale and illumination) (abstract; column 9, lines 20-25; FIG. 13; and column 1, line 63 to column 2, line 4) configured to enable a machine to:

Estimate positions of four points (detect position of six points) (column 8, line 29-40) defined by X and Y coordinates (column 13, lines 1-4), each of the points representing a facial element position in a digital image (column 13, lines 5-15),

Tian does not explicitly teach the compute transformation parameters that represent a transformation from the deformable model to the positions of the four points, and estimate a

further deformable model based on the estimated positions of the four points and the computed transformation parameters.

Prokoski also teaches a method of detecting deformable model of the face (detecting changes of facial) (FIG. 7) wherein compute transformation parameters (determine changes parameters such as conditional levels and medical status) (FIG. 17, elements 316, 340, 342, and 344) that represent a transformation from the deformable model (represent the changes) (column 6, lines 30-45) to the positions of the four points (FIG. 6), and estimate a further deformable model based on the estimated positions of the four points and the computed transformation parameters (analysis after assessments) (FIG. 17, elements 330, 332, 334, and 336). Modifying Tian's method of detecting deformable model according to Prokoski would be able to compute transformation parameters that represent a transformation from the deformable model to the positions of the four points, and estimate a further deformable model based on the estimated positions of the four points and the computed transformation parameters. This would improve processing because it would provide a robustness of analysis by automated assessment of multiple indicators and would provide a high reliability by using a sufficiently wide range of condition monitoring indicators (column 5, lines 20-34) and therefore, it would have been obvious to one of the ordinary skill in the art to modify Tian according to Prokoski.

For claim 2, Tian also teaches the medium bearing a deformable model in which the four points include a first point designating a center of a left eye (column 13, line 47).

Regarding claim 3, Tian further teaches the medium bearing a deformable model in which four points further include a second point designating a center of a right eye (column 13, lines 47-48).

Referring to claim 4, Tian discloses the medium bearing a deformable model in which the four points further include a third point designating a left corner of the mouth (column 9, line 27).

Referring to claim 5, Tian discloses the medium bearing a deformable model in which the four points further include a fourth point designating a left corner of the mouth (column 9, lines 27-28).

For claim 6, Tian shows the medium bearing a deformable model comprising a variable representing a distance between the first and second points (distance between face characteristic points would include distance between the first and the second points) (column 8, lines 45-48).

Regarding claim 7, Tian further shows the medium bearing a deformable model further comprising a variable representing a distance between the third and the fourth points (distance between face characteristic points would include distance between the third and the fourth points) (column 8, lines 45-48).

For claim 8, Tian teaches the medium bearing a deformable model further comprising a variable representing a distance between eyes and mouth (column 9, lines 25-30).

Regarding claim 9, as discussed in claim 1, Tian teaches a method comprising:

Determine a deformable model (column 11, lines 23-25) including eye positions and mouth positions (column 11, lines 20-25) for a frame of a digital image sequence (column 12, lines 10-12); and

Estimating a deformable model include eye positions and mouth positions (estimates characteristic facial features points in each detected face would include mouth and eye

positions) (column 8, lines 5-10) for a frame of the digital image sequence (column 9, lines 44-48 and column 10, lines 30-35) and

Computing transformation parameters (compute the location of the **salient** landmarks/points) (column 12, lines 18-25) that represent a transformation from the deformable model (variability/change of shape properties of pose/expression model) (column 9, line 65 to column 10, line 14) for the frame to the deformable model of the frame (column 9, lines 44-48 and column 10, lines 30-35).

As discussed in claim 1, Prokoski further teaches an estimation of a subsequent deformable model of a subsequent frame of the digital image sequence (correlation of differences i.e. movements at different time/different frames of image sequence) (column 11, lines 39-42 and column 21, lines 40-56); compute transformation parameters (determine changes parameters such as conditional levels and medical status) (FIG. 17, elements 316, 340, 342, and 344) that represent a transformation from the deformable model for the frame to the subsequent deformable model of the subsequent frame (changes of movements, expressions ..etc between frames) (column 21, lines 40-56); and estimating a further subsequent deformable model (analysis of changes such as movements or expressions after assessments) (FIG. 17, elements 330, 332, 334, and 336), for a further subsequent frame of the digital image sequence based on the subsequent deformable model (between frames) (column 21, lines 40-56) and the computed transformation parameters (determine changes parameters such as conditional levels and medical status) (FIG. 17, elements 316, 340, 342, and 344). Modifying Tian's method of detecting deformable model according to Prokoski would be able to compute transformation parameters that represent a transformation from the deformable model to the positions of the

four points, and estimate a further deformable model based on the estimated positions of the four points and the computed transformation parameters. This would improve processing because it would provide a robustness of analysis by automated assessment of multiple indicators and would provide a high reliability by using a sufficiently wide range of condition monitoring indicators (column 5, lines 20-34) and therefore, it would have been obvious to one of the ordinary skill in the art to modify Tian according to Prokoski.

Referring to claim 10, Tian teaches the method wherein computing the transformation parameters (compute the location of the **salient** landmarks/points) (column 12, lines 18-25) includes determining optimal values for the transformation parameters such that the value of an objective function based on the transformation parameters is minimized (eliminates complicated degree of freedom/normalization) (column 10, lines 10-14 and column 12, lines 40-55).

For claim 11, Tian further teaches the method in which the eye positions and the mouth positions are represented by four points defined by x and y coordinates (column 13, lines 1-4; FIG. 5B and FIG. 6).

Regarding claims 12-15, Tian teaches the method which the four points comprise a first point, second point, third point and fourth point to designate left eye center, right eye center, left mouth, and right mouth and uses labeling technique as Pn (P1, P2, P3 and P4) to label each point (FIG. 5B). Tian does not explicitly use the labeling system i = 1, i = 2, i = 3, and i = 4. However, it would have been obvious to use also use Pn system or I = n system to label each region of the image for better recognition each region of the image in order to help the system to automatically label facial expressions and facilitating retrieval base on facial expressions

(column 7, lines 60-64). This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify Tian to implement a labeling method.

Regarding claim 16, Tian teaches the method in which the four points of the subsequent deformable model (column 9, lines 44-48 and column 10, lines 30-35) are determined by six parameters (distance's parameters and histogram's parameters) (column 13, lines 20-44) and the deformable model (column 13, lines 45-47).

Referring to claim 17, Tian teaches the method of in which the six parameters comprise:

a first parameter representing a distance increase between eyes (distance between left and right eyes) (column 12, lines 60-67);

a second parameter representing a distance increase between eyes and mouth (column 13, lines 25-28);

a third parameter representing a distance increase between mouth corners (column 13, lines 30-33);

a fourth parameter representing a rotation angle (column 13, lines 60-67);

a fifth parameter representing a shift value along an X axis (L or N) (FIG. 6);

a sixth parameter representing a shift value along a Y axis (M or K) (FIG. 6).

Regarding claim 18, please refer back to claim 9 for further teachings and explanations. In addition, Tian teaches a computer program product comprises instruction stored on a computer-readable storage device (column 7, lines 57-60 and column 9, lines 49-50) to perform the aforementioned limitations.

For claims 19-20, please refer back to claims 10-11 respectively for further teachings and explanations.

For claims 21-24, please refer back to claims 12-15 respectively for further teachings and explanations.

Regarding claim 25, Tian teaches the product in which the four points (FIG. 9, element 905) of the subsequent deformable model (column 9, lines 45-48 and column 1, lines 23-25) are determined, at least in part, based on six parameters (distances) (column 15, lines 1-21).

For claim 26, please refer back to claim 17 for further teachings and explanations.

For claim 27, as discussed in claim 9, Tian teaches a method comprising:

Receiving a first digital image in a sequence of digital images (FIG. 4, element 410) and eye and mouth coordinates (FIG. 5B);

Outputting (column 12, lines 5-10) eye and mouth coordinates on a subsequent digital image in the sequence of digital images (FIG. 6).

For claim 28, as discussed in claim 9, Tian further teaches the method in which receiving further comprises estimating a base face model and the base face model's transformation parameters T' by the eye and mouth coordinates (transform characteristic points of a face would include transformation parameters of the eye and the mouth coordinates) (column 12, lines 40-56).

Regarding claim 29, Tian also teaches the method in which outputting comprises:

Calculating an initial model M as a transformed base model M_b using transformation parameters T' (that is the concept of transformation process) (column 5, lines 34-38 and column 12, lines 55-56);

Rotating the subsequent image to I(x, y) to generate a normalized model M (column 13, line 55 to column 14, line 8).

Allowable Subject Matter

5. Claims 30-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcome the objection of the claims.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q. Le whose telephone number is 571-272-7424. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner can be reached on 571-272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian Q Le/
Primary Examiner, Art Unit 2624
July 15, 2008